*Cable Pressure Monitoring System*

Addressable Transducer Tester

# PVD860
# User's Manual

**(P012190 - Rev. C)**

**226A Commerce St.**
**Broomfield, CO 80020**
**800.521.5351 303.427.3700**
**Fax: 303.657.2233**

**www.puregas.com**

# Table of Contents

1. Introduction ..... 1

2. Main Functions and Features ..... 1

3. Technical Characteristics ..... 2

4. Structure ..... 3

5. Test Configurations ..... 4

6. Functions and Operation ..... 5

*6.1 Tester startup ..... 5*

*6.2 Tester turnoff ..... 5*

*6.3 Tester sleep mode ..... 5*

*6.4 Battery charging ..... 6*

*6.5 Reading a transducer ..... 6*

*6.6 Reading other transducer parameters ..... 8*

*6.7 Sensor Setup ..... 11*

*6.8 Sensor Type Setup ..... 13*

*6.9 Pair Test ..... 13*

*6.10 Address Mapping ..... 16*

*6.11 Data Report ..... 18*

*6.12 Calibrate ..... 20*

*6.13 System Operate ..... 20*

## 1. Introduction

The PVD860 is a portable addressable transducer tester designed to automatically test, program and calibrate a variety of addressable transducers. This tester is able to calibrate addressable transducers on the production line and to make its production easier. And also, it can test the transducers installed in the field to check the operational status of these transducers. Besides, it can measure wire resistance, capacitance, and voltage to verify the quality and suitability of the reporting pair(s). In order to make an addressable transducer work properly, one can use this tester to set up the address for each transducer. With the tester LCD display, test data can be displayed and monitored. The PVD860 is portable, reliable, accurate and above all, easy to operate. It can be used as an all in one instrument for installation and maintenance of addressable transducers.

## 2. Main Functions and Features

- High Accuracy and high resolution
- 128*64 LCD display, 4*4 keyboard
- Test the addressable transducers before and after installation
- Calibrate transducers on the production line
- Transducer address setup and verify
- Measure wire voltage, insulation and capacitance
- Test wire pair balance
- Measure transducer answer current and quiescent current including maximum and minimum values
- Detect the address on pairs and display its voltage wave
- Average scanning time of 3 seconds per transducer
- Pair search mode to determine active addresses(multi-mode search)
- Data report function
- Optional password feature
- Extensive diagnostic facilities
- Real clock to display year, month, day, hour, minute and second

- Auto power save
- NiCad battery with charge supervision
- Short circuit and over voltage protection
- Lightning protection
- Audio Beeper to give audible warnings

## 3. Technical Characteristics

| PARAMETERS | CHARACTERISTICS |
|---|---|
| ***Power*** | |
| Operational Voltage | DC3.3V ± 0.05V |
| Operational Power Supply | 4 AA rechargeable battery with 1600mAh |
| Operational Time with Battery | 8 hours continuous operation<br>240 hours for sleeping |
| Power Adaptor (recharging) | DC12V ± 2V，500mA |
| Recharging Time | <4 hours |
| Static Power Consumption | 15 mW |
| Power Consumption with backlight | 75 mW |
| Power Consumption with transducer operation | 300 mW |
| Power Consumption for Sleeping | 2 mW |
| ***Measurement Index*** | |
| Output voltage | 50V ± 2V |
| Max. Output Current | 20mA |
| Measuring Voltage | Range: 5V ～ 95V<br>Accuracy: ± 0.5V |
| Measuring Current | Range: < 15mA<br>Resolution: 4uA |
| Measuring Resistance | Range: < 10MΩ<br>Accuracy: ±%1 (< 500 kΩ) |
| Measuring Capacitance | Range: < 100uF<br>Accuracy: ± 0.2uF |
| Measurement Accuracy for Transducers | ± 0.5‰ |
| Data Memory | Save 40 times result for searching transducers and 200 detailed records for reading transducers |
| ***Physical Properties*** | |

| | |
|---|---|
| Size | 180*100*33 |
| Weight | 400 g |
| Display | LCD 128*64 matrix dots with backlight |
| Keyboard | 4*4 keys |
| Language | English |
| Power Socket | DC power jack |
| Power Switch | Pushbutton switch |
| Monitoring Pair and Ground Connectors | 3 Banana Socket with 3 Test Pens |
| ***Environmental Conditions*** | |
| Temperature | 0℃～60℃ |
| Relative Humidity | 0 to 80%Rh non-condensing |

## 4. Structure

1 ——Display panel

2 ——Power switch

3 ——Keyboard

4 ——Test socket B

5 ——Test socket A

6 ——Test socket E

7 ——Sensor write-enable zone

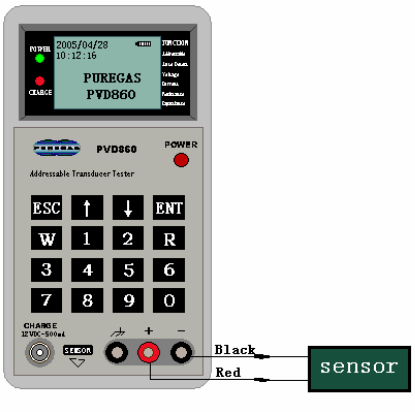
8 ——Socket for charging power supply

9 ——LED (Red) for charging

10 ——LED (green) for charging power supply

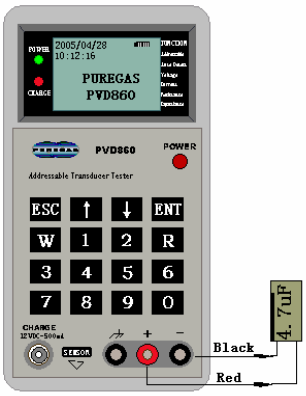
## 5. Test Configurations

Test port comprises three banana sockets: socket A, socket B and socket E. During testing socket A is the positive pole and socket B is the negative pole. Socket E is used to test ground resistance. The various test configurations are shown below:

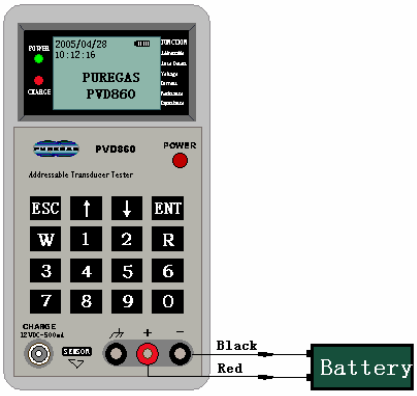



(A) Testing transducers

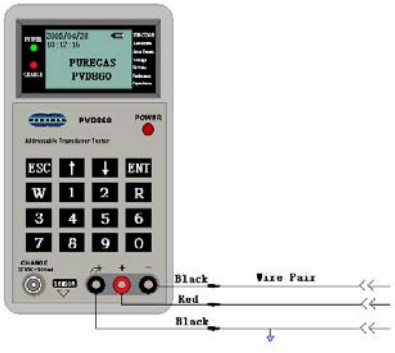
(B) Measuring resistance




(C) Measuring capacitance




(D) Measuring voltage

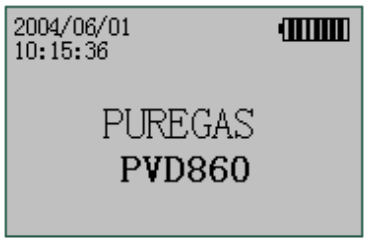



(E) Testing Wire

# 6. Functions and Operation

## 6.1 Tester startup

Push the power switch down and tester will start in two seconds. After that, the panel displays the homepage as the following fig. IB1. In any term, press “ESC” once or more to exit to the homepage.




IB1

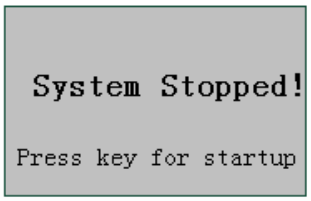
In the top-left corner current date and time are displayed. In the top-right corner, the battery meter is displayed.

## 6.2 Tester turnoff

Release the power switch to turn off tester.

## 6.3 Tester sleep mode

When the tester is not operated for the user programmed sleep time, it will go into sleep mode during which all functions will be shut down and it will consume minimal power. Sleep mode is shown as the following figure IB151. Press any key to resume normal operation.




IB151

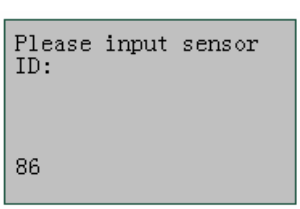
## 6.4 Battery charging

When the battery meter on the homepage indicates less than one segment, normal operation is inhibited and recharging is required. Push the plug of the charge adaptor into the charge socket of the tester and the green LED will come on to indicate the charger is connected. The red LED will come on whilst charging is in progress. The red LED will switch off when charging is complete.

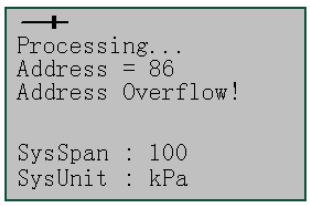
## 6.5 Reading a transducer

There are three methods to read the transducer: Read with its address, Auto-answer with power-on and Answer with an order.

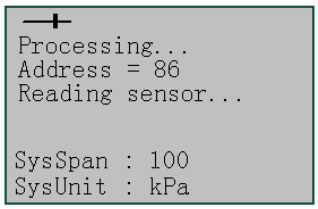
On the homepage, press numeric keys to input the address of the transducer. Refer to figure IB39. Except for 882-ADR transducer like UTEL's, their address must be smaller than 128. For 882-ADR transducer, the address must be smaller than 64. Or else the tester will indicate "Address Overflow" as shown in figure IB152.




IB39




IB152




IB40

After the address is input, press "R" key to begin to read transducer as shown in figure IB40. Results for reading transducer are displayed as per figure IB153, IB154 and IB155. Figure IB153 shows a normal read result whilst figures IB154 and IB155 show error conditions. In these figures, "SysSpan" is the full-range to be set. "SysUnit" is the data unit to be set.

On the homepage, press " ↑ " and "R" to read the transducer with Auto-answer with power-on. This type of transducer can automatically send the answer current as a reading after it is powered on.

On the homepage, press " ↓ " and "R" to read the transducer with Answer with an order. This type of transducer can automatically send the answer current as a reading after it

gets an order from PVD860. For Dedicated Solid State Transducer, this method should be used.

After reading the transducer, its results can be shown with different modes. Figure IB153 shows a normal result. In this figure, the top-left corner shows read progress. “Curr” displays the latest reading. “Max” shows the maximum reading since the “read” operation commenced and “Min” shows the minimum reading since the “read” operation commenced. “I” is the answer current of the responding transducer. “Data” shows the read value (such as air pressure or flow). For “I”, “Curr” is the latest value and “Max” and “Min” are the highest and lowest values since the command was commenced. Taken together the readings will provide a good indication of the stability and quality of the readings being received. The fourth line of the display (figure IB153) shows the reading status. The figure on the right of “Sum” is the total number of times the transducer has been read since the command started and that on the right of “Fault” is the number of errors that have occurred during that time. The bottom line shows the “addr” (address) of the transducer being read. The bottom-right corner shows the type of transducer being read which includes:

"881-PWR" : Type 881/880, auto-answer with power-on;

"881-ORD" : Type 881/880, answer with an order;

"881-ADR" : Type 881/880, read with its address;

"882-PWR-A" : Type 882, class A, auto-answer with power-on;

"882-PWR-B" : Type 882, class B, auto-answer with power-on;

"882-ORD-A" : Type 882, class A, answers with an order;

"882-ORD-B" : Type 882, class B, answers with an order;

"882-ADR-A" : Type 882, class A, read with its address;

"882-ADR-B" : Type 882, class B, read with its address.

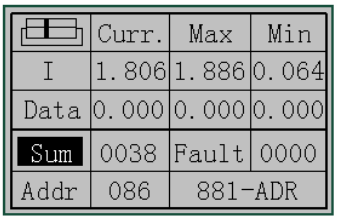
"SPN-PWR" :Type SPAIN, auto-answer with power-on;

"SPN-ORD" :Type SPAIN, answer with an order;

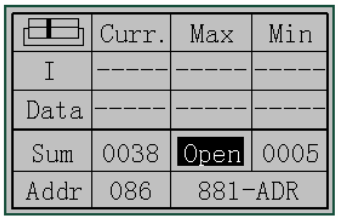
"SPN-ADR" :Type SPAIN, read with its address;

When the transducer is reading OK, “Sum” is displayed in reverse color (as shown in figure IB153). If an error is occurring then “Fault” is in reverse color (as shown in figures

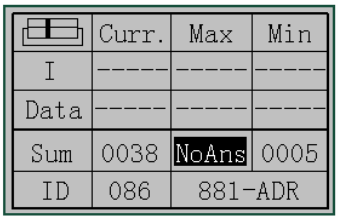
IB154 and 155).




IB153



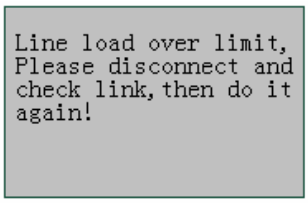

IB154



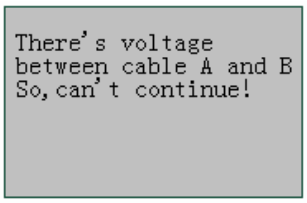

IB155

"Open" indicates no transducer is connected or bad continuity to the test sockets. "Mult" indicates multiple transducers are synchronously answered. "Nega" shows a negative value is answered. On the right is the total number of times that this fault has occurred since the command started. Figure IB155 shows a "NoAns" (No answer) alarm which suggests that a transducer or similar load is connected to the test socket, but no answer was received. This may be because there is no transducer with right address or because the particular transducer in not functioning.

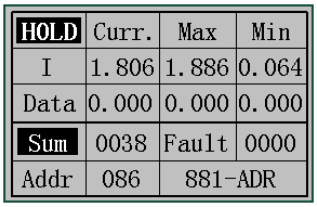
When the tester is reading or setting a transducer, the following special error messages may appear: Figure IB6 shows test socket A and B to be shorted or to be connected to an excessive load. Whilst Figure IB7 shows that a "foreign" voltage (more than 5 Volts AC or DC) was present on the pair before the tester voltage (50 VDC) was applied to the pair. Under the above two circumstances the tester will not proceed with the test.




IB6




IB7

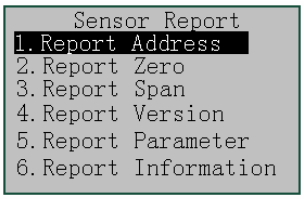



IB171

During reading the transducer, press "ENT" to lock the display. Press "ENT" again to release this display.

## 6.6 Reading other transducer parameters

On the homepage (IB2), press "R" key to display the menu of available parameter measurements:

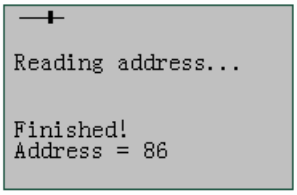



IB2

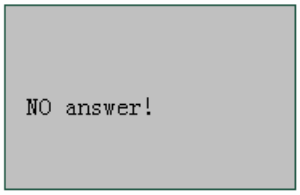
This menu has 6 items including “Report Address”, “Report Zero”, “Report Span”, “Report Version”, “Report Parameters” and “Report Information”. On this page, press up/down arrow keys to select any item of this menu which will be highlighted. After selection, press the “R” key to execute this item.

### 6.6.1 Report Address---Determine the transducer address

In figure IB2 press “R” to begin to read the transducer address. Note that only one transducer can be connected to the tester! There are two results to be shown as follows: Figure IB4 shows a valid result and figure IB5 shows a fault transducer which has failed to respond.



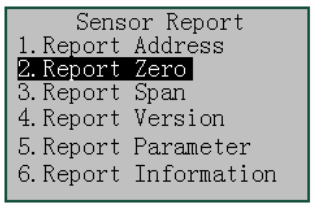

IB4



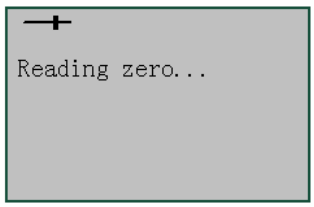

IB5

### 6.6.2 Report Zero---Read the transducer zero reference

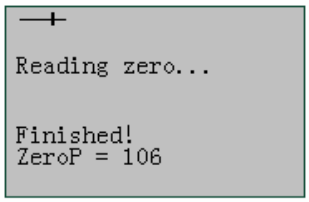
Figure IB8, IB9, IB10 and IB5 explain the progress of reading the transducer zero reference which is similar to that of “Report address”. “ZeroP” is the transducer internal zero reference value.



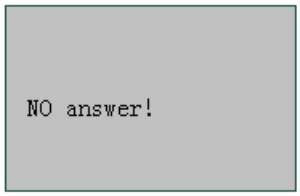

IB8




IB9




IB10



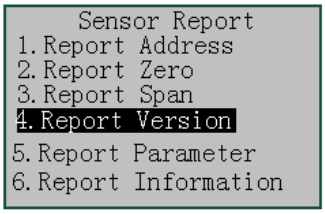

IB5

### 6.6.3 Report Span---Read the full range of the transducer

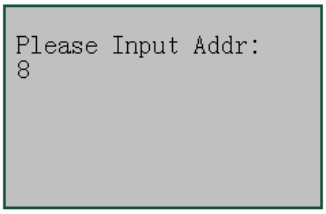
"Report Span" is similar to that of "Report address".

### 6.6.4 Report Version---Read the transducer version

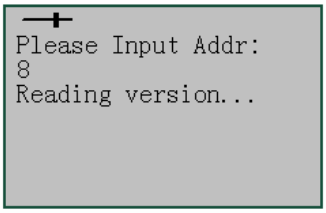
Every transducer (depended on specific transducer) has one version which is written inside the transducer. Transducer version can be read via the wire pair for any selected transducer. Press "R" and then display "Please Input Addr". After the transducer's address is entered the tester displays the transducer version shown as figure IB23, IB24, IB25 and IB26.



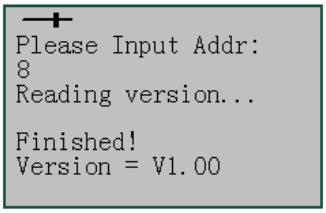

IB23




IB24




IB25




IB26

### 6.6.5 Report Parameter

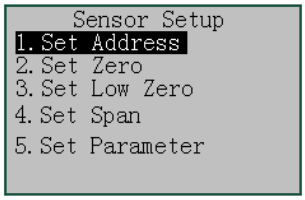
This menu is only for debugging the transducer during manufacturing.

### 6.6.6 Report Information

This menu is only for debugging the transducer during manufacturing.

## 6.7 Sensor Setup

On the homepage IB1, press “W” to go into the main menu shown as figure IB30.

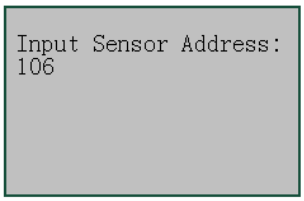



IB30

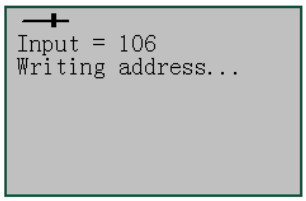
This main menu is composed of five submenus including “Set Address”, “Set Zero”, “Set Low Zero”, “Set Span” and “Set Parameter” shown as IB30. Use up/down arrow keys to select the required submenu.

### 6.7.1 Set Address---Set the transducer address

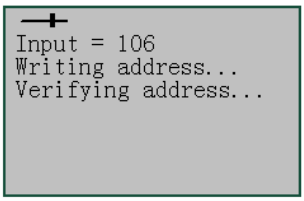
In figure IB30, press “W” to go into the transducer address program mode shown as figure IB32. This prompts user to input the desired new address for this transducer. After entering the correct address, press “W” to begin to write this address shown in figure IB33. It must be noted that the address is less than 128 for 880/881 transducer and less than 64 for 882 transducer.




IB32



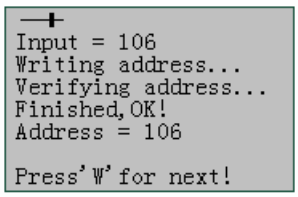

IB33



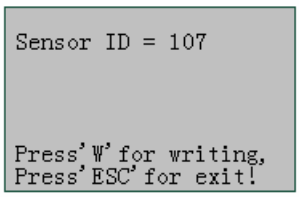

IB34

After the address is written into the transducer, the tester will verify it automatically. If the readout address from the transducer is the same as the written address, the tester displays “Finished, OK!” shown as figure IB35 and sounds one long beep. If not, the tester displays “Finished, ERROR!” as figure IB37 and sounds two short beeps and one long beep. The second displayed address on these screens is that reads out from the transducer shown on screen IB35 and IB 37.

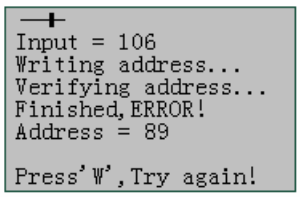
The prompts at the bottom of figure IB35, IB36 and IB37 show the way in which operation for address setup can be repeated or cancelled. In figure IB35, press “W” to set next address (ID=107 shown as IB36) for next transducer.



IB35



IB36

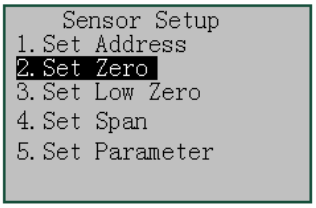


IB37

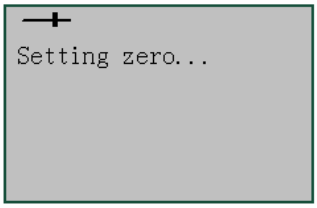
Note: If the addressable transducer has its wire link write-protect feature activated (cut), then the transducer must be placed near "Sensor write-enable zone" marked on the panel of PVD860 which will temporarily disable the write-protect feature.

### 6.7.2 Set Zero---Set the transducer zero reference

In figure IB42, press "W" to go into "Set Zero" to set the transducer zero reference (local atmospheric pressure) shown as IB43.

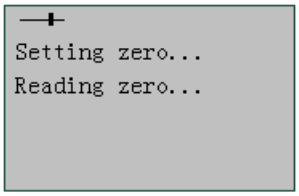


IB42

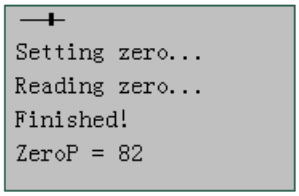


IB43

After finishing the setup, the tester can read the zero reference from the transducer, shown as figure IB44. If successful, the tester displays IB45.



IB44



IB45

### 6.7.3 Set Low Zero---Set the transducer "low" zero reference

"Set Low Zero" is similar to "Set Zero", which is used for specific application.

### 6.7.4 Set Span---Set the full range of the transducer

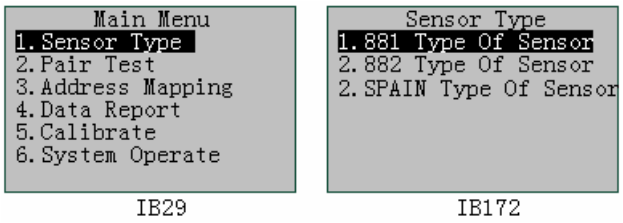
This menu is used for debugging the transducer during manufacturing.

### 6.7.5 Set Parameter

This menu is used for debugging the transducer during manufacturing.

## 6.8 Sensor Type Setup

On the homepage IB1, press "ENT" to go into the main menu shown as IB29. But it must be noted that if the system password is enabled then the PVD860 will prompt the user to input the system password. After this password is acknowledged, the IB29 will be displayed which includes six submenus: "Sensor Type", "Pair Test", "Address Mapping", "Data Report", "Calibrate" and "System Operate".



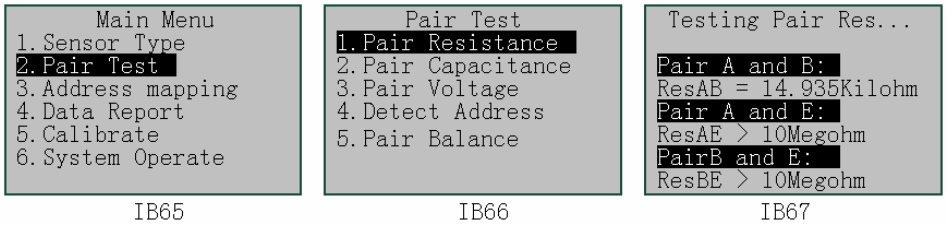

On the IB29, select first item and press "ENT" to go into "Sensor Type" shown as IB172. Here the type for transducer can be selected. After "ENT" key is pressed, this transducer's type is written in this transducer.

## 6.9 Pair Test

The tester can measure four parameters for the wire pairs connecting transducers: resistance, capacitance, voltage and pair balance.

### 6.9.1 Wire Resistance---Measure resistance

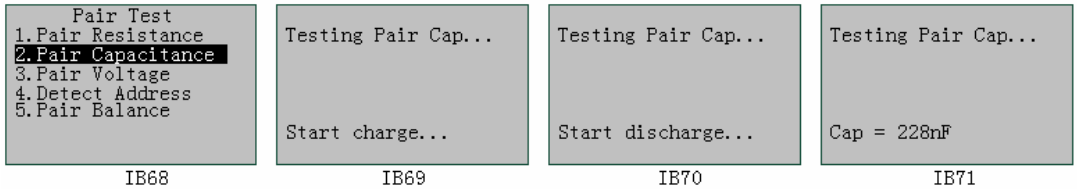
In figure IB65, press "ENT" to go into IB66 and then press "ENT" again to begin resistance measurement. Wire resistance includes three measurements: resistance between socket A and B, resistance between socket A and E, resistance between socket B and E. All measurements are done automatically. When the resistance to be measured is more than 10 MΩ, the tester displays "> 10Megohm" shown as figure IB67.




IB65 IB66 IB67

### 6.9.2 Wire Capacitance---Measure capacitance

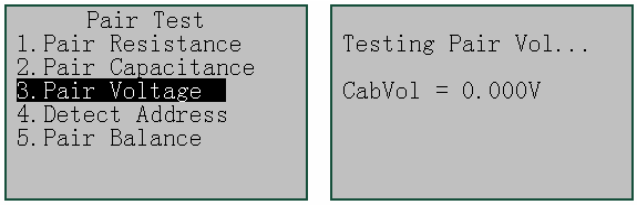
Based on RC time constant, the tester can measure capacitance less than 100uf. When capacitance is more than 100uf, the tester will stop. Measuring time changes with different capacitance. Figure IB68, IB69, IB70 and IB71 show the process of measuring capacitance.




IB68 IB69 IB70 IB71

### 6.9.3 Wire Voltage---Measure voltage

The tester can measure the voltage ranged from 5 to 95Volts. Note that the voltage between socket A and B must be less than 100Volts. When this voltage is over 100Volts, the protection circuit for the tester port will operate and also output current of the external source which provides this voltage will be rapidly increased. An accident could occur. Figure IB160 and IB161 show the process of measuring voltage. Once a second the reading of voltage will be updated.

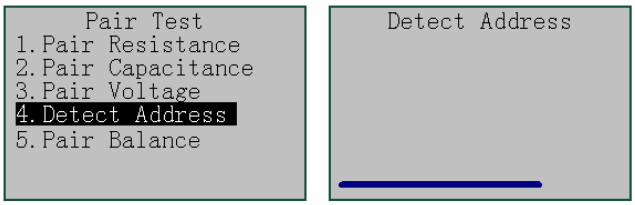



IB160 IB161

### 6.9.4 Detect Address---Detect the address on pairs and display its voltage wave

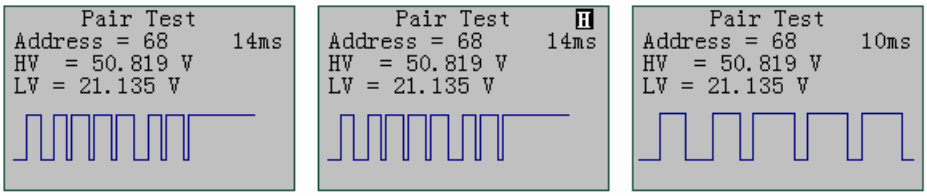
The tester can detect the address on the pairs, and also display its voltage wave. First,

hang the test hooks of PVD860 with socket A and B on the wire pairs. And then press "ENT" in figure IB164 to start to detect the address on the pairs shown as figure IB165. In figure IB165, the bottom line shows the voltage wave corresponded to the address sent from the air pressure monitoring system.




IB164 IB165

If there is an address to be on the wire pairs, then figure IB166 will be displayed in which "Address" is an address to be just detected on pairs and "Crest" is the voltage value of wave crest and "Trough" is the voltage value of wave trough. The "14ms" shown in figure IB166 represents that each dot of horizontal axis for address wave takes 14ms (Note that each dot of vertical axis of address wave represents 2 volts). In figure IB166, press "ENT" key to hold the viewing wave on as figure IB167 on the top-right of which the reverse color "H" will be displayed. And press "ENT' once more to cancel "hold on". During detecting, press different numeric keys to change time scale division of LCD screen. Each dot time is 2 times the number of key with the unit of millisecond (Note that key "0" represents 10). For example, press the key "5" to scale the wave wider shown in figure IB168 (Its time scale division is 10ms).

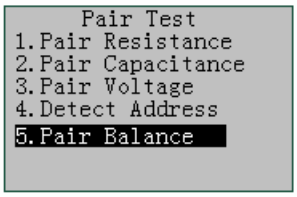



IB166 IB167 IB168

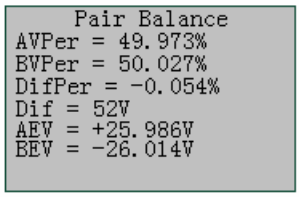
### 6.9.5 Pair Balance---Test wire pair balance

The tester can test wire pair balance with the two voltages between pairs and ground. First, hang the test hooks of PVD860 on wire pairs and ground according to figure E in the section 5. And then press "ENT" in figure IB169 to start to test wire pair balance. The

test results are shown in figure IB170. In this figure, "AVPer" is the ratio, with percent, of the voltage between A and E to the voltage between A and B. "BVPer" is the ratio, with percent, of the voltage between B and E to the voltage between A and B. "DifPer" is the difference between "AVPer" and "BVPer". "Dif" is the voltage between A and B. "AEV" is the voltage between A and E. "BEV" is the voltage between B and E.



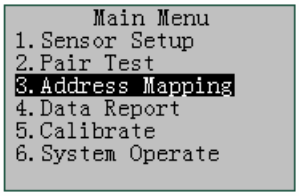

IB169



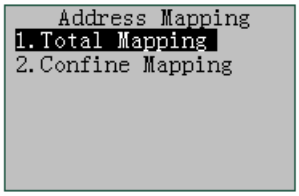

IB170

## 6.10 Address Mapping

The tester provides the convenient and intuitive function for searching for "lost" transducers. The search results are automatically saved in the tester. The following figures show the options of "Total Mapping" and "Confine Mapping", which determines how the pair is searched.



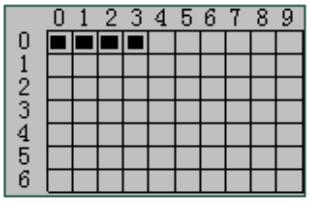

IB72



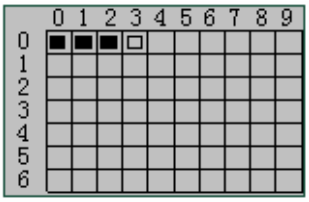

IB73

### 6.10.1 Total Mapping --- Search all transducers on the wire pair

In figure IB73, press "ENT" to the entire 0-127 address range on the wire pair. Searching begins at address 0, 1, 2… and ends at address 127 shown as figure IB75 and IB76. In the process of searching, a small square flashes. If any transducer with the related address exists on the wire pair and is detected, the small square related with this transducer is displayed as a solid block.

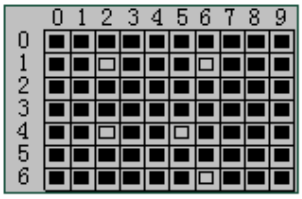



IB75

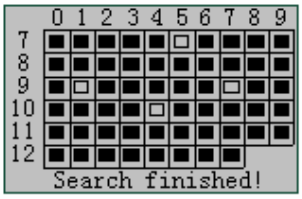



IB76

Press “ESC” key at any time to interrupt searching. After completing it the tester will display “Search finished!” shown as figure IB77 and IB78 (Use up/down arrow keys for paging IB77 or paging IB78) and sound a beep once.




IB77

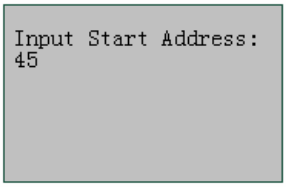



IB78

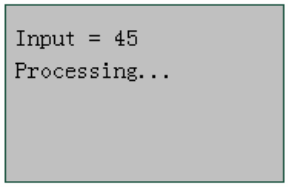
In figure IB77 and IB78, the number in the horizontal direction is unit’s digit of the transducer address and the number in the vertical direction are its tens digit and hundreds digit. For example, there are the addresses from 0 to 9 on the first line of figure IB77 and the addresses from 70 to 79 on the first line of figure IB78 and the addresses from 120 to 127 on the last line of figure IB78. In figure IB77, the transducers with the address 12, 16, 42, 45 and 66 don’t exist. It takes about 15 minutes to search the whole address range from 0 to 127.

### 6.10.2 Confine Mapping---Search the transducers required by user

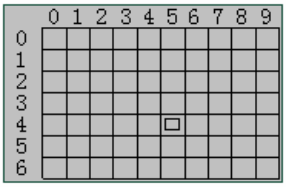
“Confine Mapping” is performed like “Total Mapping”. Only difference is that “Confine Mapping” requires a user to input the starting address for searching shown as IB80. After user inputs the address and presses “ENT”, the tester begins to search and displays as per figures IB81, IB82 and IB83.



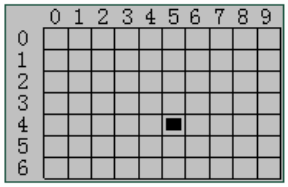

IB80




IB81




IB82

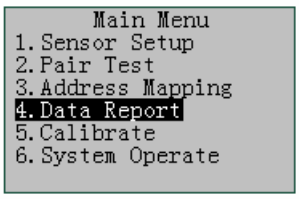



IB83

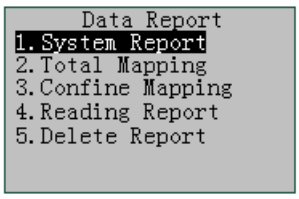
During address mapping for 882 type, “■” represents “A” type of transducer is found and “◘” represents “B” type of transducer on this wire pair. If nothing is displayed, no transducer is found.

## 6.11 Data Report

The tester provides the comprehensive data reports. In figure IB84, press "ENT" to go into "Data Report" which includes "System Report", "Total Mapping", "Confine Mapping", "Reading Report" and "Delete Report" shown as figure IB85.



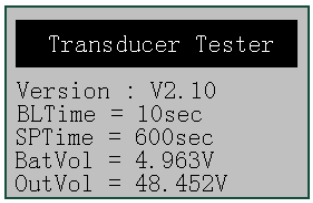

IB84



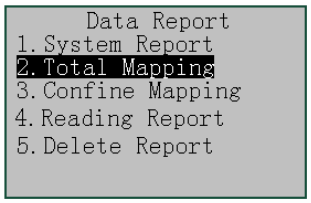

IB85

### 6.11.1 System Report---Report system parameters

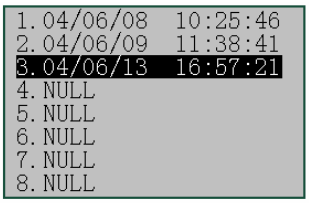
In figure IB85, press "ENT" to go into figure IB86 which displays "Version", "BatVol", "BLTime", "SPTime" and "OutVol". "Version" in this case is the tester firmware version. "BatVol" is the current battery voltage. "BLTime" is the backlight time. "SPTime" is the waiting time before going into sleep mode. "OutVol" is the output voltage between socket A and B while testing the transducer.




IB86



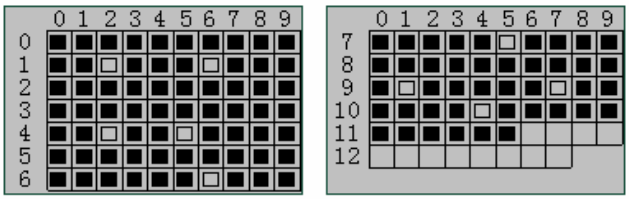

IB54




IB55

### 6.11.2 Total Mapping---Report the result searching all transducers

In figure IB54, press "ENT" to go into "Total Mapping" shown as figure IB55. In figure IB55, the first number of every line is the index number for data report and its next numbers are date and time at which the wire pairs begin to be searched. Maximum index is 24 and the report is saved as a scroll buffer. NULL is an index without data. Use up/down arrow keys to select the required item and then press "ENT" to display the report shown as figure IB162 and IB163(use up/down arrow keys to page up and page down). Existing transducers are shown with a solid square in the panes with related address, or else with a hollowed square (no transducer detected at that address).




IB162 IB163

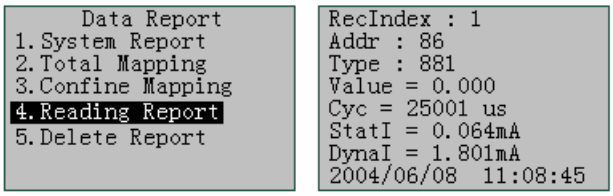
### 6.11.3 Confine Mapping---Report the result searching the required transducers

"Confine Mapping" is performed like "Total Mapping".

### 6.11.4 Reading Report---Report the result reading transducers

When reading a transducer, all parameters will be saved. In figure IB149, press "ENT" to go into reading report shown as figure IB150 which displays "RecIndex", "Addr", "Type", "Cyc", "Value", "StatI", "DynaI" and date and time. "RecIndex" is the index number of the report. "Addr" is the address of the transducer. "Type" is the type of the transducer. "Cyc" is the cycle number of transducer signal wave. "Value" is the reading of the transducer. "StatI" is the quiescent current of the transducer. "DynaI" is the answer current of the transducer.

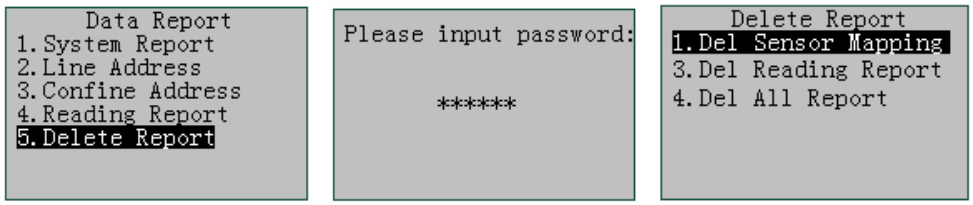
Maximum index of reading reports is 200 and the report is saved like scroll buffer.




IB149 IB150

### 6.11.5 Delete Report---Delete the existing report

In figure IB87, press "ENT" to go into deleting report. Note that user must input password before deleting report shown as figure IB27. After the correct password is entered, the tester will display figure IB88 which includes four items: "Del Sensor Mapping", "Del Reading Report" and "Del All Report".




IB87 IB27 IB88

(1) Del Sensor Mapping

In figure IB88, press "ENT" to go into "Del Sensor Mapping" item which will delete the searching report created by "Total Mapping" function,.

(2) Del Reading Report

"Del Reading Report" is performed like "Del Sensor Mapping".

(3) Del All Report

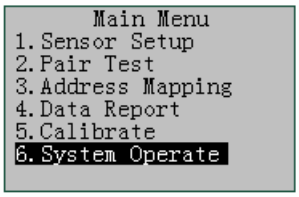
"Del All Report" is performed like "Del Sensor Mapping".

## 6.12 Calibrate

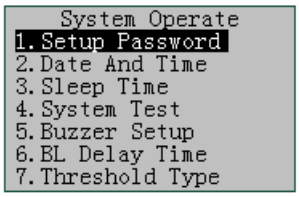
In general, tester calibration is a factory procedure. Thus the details are not explained here.

## 6.13 System Operate

"System Operate" is a setup menu composed of "Setup Password", "Date and Time", "Sleep Time", "System Test", "Buzzer Setup", "BL Delay Time" and "Threshold Type". "Setup Password" is used to set the password for system operation. "Date and Time" is used to set the real-time clock. "Sleep Time" is used to set the waiting time before going into sleep mode. "System Test" tests some parts of the tester. "Buzzer Setup" is used to enable or disable the buzzer. "BL Delay Time" is setting backlight delay time. "Threshold Type" is used to set the transducer threshold type. In figure IB113, press "ENT" to go into "System Operate" shown as figure IIB114.




IB113

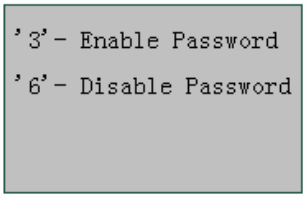



IB114

### 6.13.1 Setup Password---Set the password for system operation

"Setup Password" includes "Enable Password" and "Change Password" shown as figure IB115 and IB116.

IB115




IB116

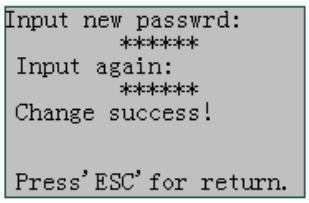
(1) Enable password

In figure IB116, press "3" key to enable password. Press "6" key to disable password.

(2) Change password

In figure IB119, press "ENT" to go into "Change Password" which is used to change the password. In figure IB120, user inputs new password once and inputs the same password again to change the password. Password is a six-digit number. If the input password is right, the tester displays "Change success!" shown as figure IB120. If it is wrong, displays "Input error!" shown as figure IB121.

IB119

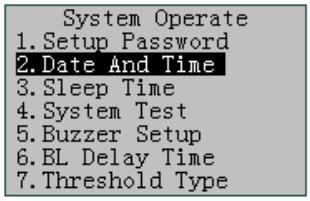



IB120

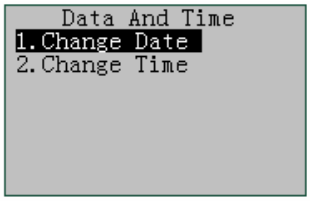
IB121

### 6.13.2 Date and Time---Set date and time of the tester

In figure IB122, press "ENT" to go into "Date and Time" which is used to set the date and time of the tester shown as figure IB123.



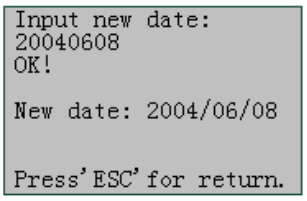

IB122



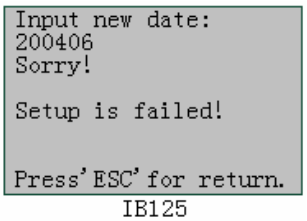

IB123

(1) Change Date

In figure IB123, press "ENT" to display figure IB124 which is used to input the current date. If today is Jun.8, 2004, for example, input the digit of 20040608. If input is right, figure IB124 is displayed, or else figure IB125 is displayed.



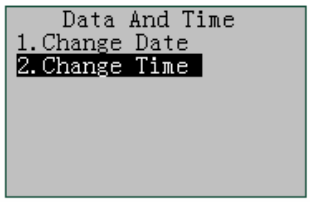

IB124



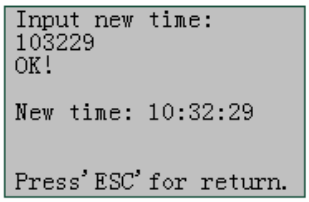

IB125

(2) Change Time

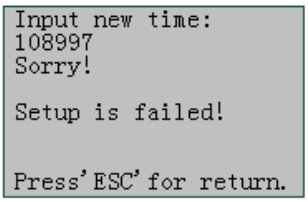
In figure IB126, press "ENT" to display figure IB127 which is used to input the current time. If it is 10:32:29, for example, input the digit of 103229. If input is right, figure IB127 is displayed, or else figure IB128 is displayed.




IB126



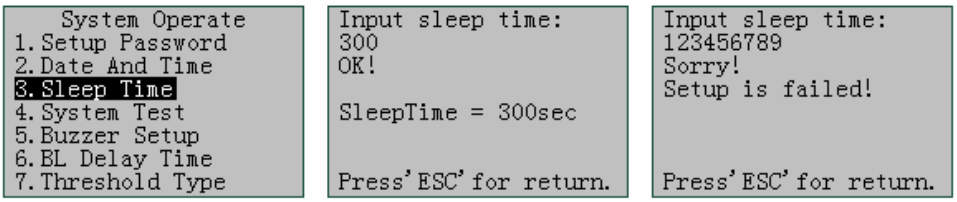

IB127




IB128

### 6.13.3 Sleep Time---Set the waiting time before going into sleep status

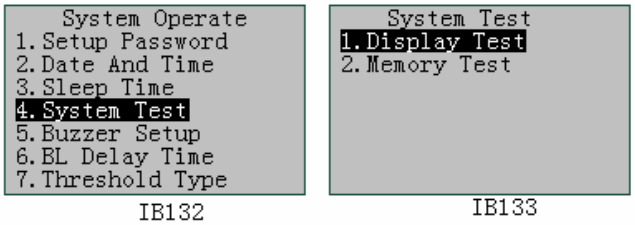
When the tester is in the sleeping status, all of its functions are shut down so that its power consumption is least to make operating time longer. After the tester is not operated by user for the sleeping time, the tester goes into the sleeping status. In figure IB129, press "ENT" to go into "Sleep Time" shown as figure IB130 which is used to input the sleeping time (from 30 to 3600 seconds). Under sleeping status, press any key to quit.




IB129 IB130 IB131

### 6.13.4 System Test---Test the some parts of the tester

In figure IB132, press "ENT" to go into "System Test" which includes "Display Test" and "Memory Test" shown as figure IB133.




IB132 IB133

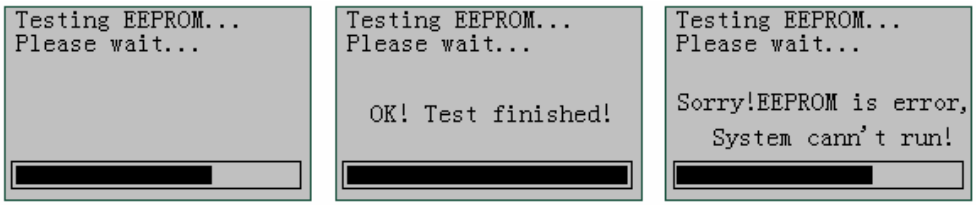
(1) Display Test

In figure IB133, press "ENT" to test the LCD of the tester shown as figure IB134 (black color) and IB135 (gray color) to make user estimate the LCD. If a stain appears on the LCD, then the display may be defective.

IB134 IB135

(2) Memory Test

User can test data memory of the tester. Figure IB137 shows the process of testing memory with the schedule meter. If test is all right, figure IB138 is displayed, or else figure IB139 is.

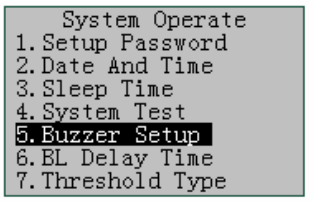



IB137 IB138 IB139

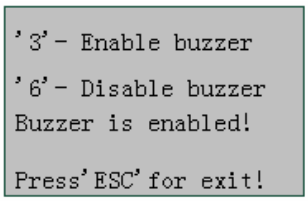
### 6.13.5 Buzzer Setup---Set the buzzer

In figure IB140, press "ENT" to go into "Buzzer Setup" which is used to enable or

disable the buzzer of the tester. In figure IB141, press "3" to enable the buzzer and press "6" to disable the buzzer.



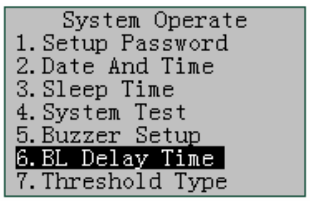

IB140



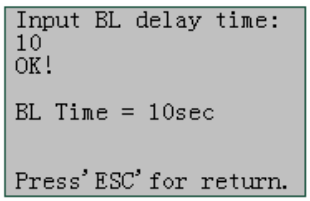

IB141

### 6.13.6 BL Delay Time---Set the backlight delay time of LCD

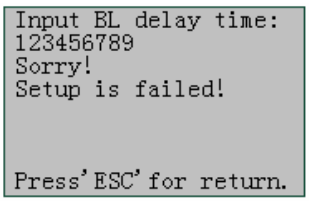
When any key is pressed at any time, the backlight is turned on. But if no key is pressed for a period of time, it is automatically turned off. This "period of time" is called the backlight delay time (BL Delay Time). Unit of "BL Delay Time" is second. Its maximum is 255 seconds. If it is set to zero, the backlight is not turned on at any time until it is enabled. In figure IB142, press "ENT" to set the backlight delay time shown as figure IB143 and IB144.




IB142



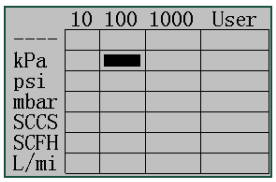

IB143




IB144

### 6.13.7 Threshold Type---Set the transducer threshold type

The transducer threshold type is used to select the full-range of the current reading and its display units. There are five types of thresholds shown in figure IB173. Move the cursor with the reverse color upwards and downwards and press "ENT" to select the required threshold type. On the first line, "----" shows no unit. In "User" column, the required full-range can be input.




IB173